METHOD AND SYSTEM FOR PROVIDING COMMUNICATION CONTROL FUNCTIONALITY AT A REMOTELY LOCATED SITE

This application is a continuation-in-part of Serial No. 08/933,518, filed September 18. 1997 and entitled Virtual Call Center.

Technical Field

The present invention relates to remote communication services, and more particularly, to a system for providing communication control functionality at a remotely located site using a data network, such as the Internet.

Background of the Invention

Presently, customer service representatives or agents located at a call center site answer incoming calls from customers placing product orders, requesting information, etc. Typically, call center sites are centrally located on a merchant's premises. However, with densely populated cities and the associated traffic problems, it is desirable to allow customer service representatives to work at home. In addition, it is advantageous to permit temporary or part-time customer service representatives (which may be hired during holidays or busy periods) to also work from home.

Two problems arise when permitting customer service representatives to work remotely from home. First, it can be difficult to ensure the security of the system. Because the representatives are remotely located, there is a risk that unauthorized personnel will improperly receive access to incoming calls.

Second, remote workers should be provided the same functionality as call center agents working at a central call center site. Remote workers should be provided with a merchant application (e.g., a merchant's product order form) to process customer orders in the same manner as performed by representatives located at the central call center site. More significantly, remote customer service representatives should have full call control functions, such as the ability to place a call on hold, transfer a call, conference together two parties, speed dial

functions, etc. Such call control features are not available on analog telephones operating over analog telephone lines (i.e., POTS lines).

Therefore, a need exists for a technique to provide full call center functionality (e.g., the merchant application and full call control functionality) as well as other communication control functionality to remote workers and to improve system security.

Summary of the Invention

The present invention is directed to a method of providing communication control functionality to at least one communication device located at a remote location. Log in information is received at a server via at least one communication network. The log in information is verified and origination address information is obtained for the at least one communication device. A communication link is established between the communication device and a merchant system. The merchant system provides the communication device with communication control functionality.

The present invention is further directed to a method for providing a remote communication device with enhanced call control functionality provided by the network as opposed to being provided by the communication device itself. By providing the user at the remote communication device with access to voice and data communications, the remote communication device is able to emulate the enhanced functionality which is typically provided by an ISDN telephone, for example without the user being required to have an ISDN line. The communication can occur over regular communication lines which may be PSTN lines, IP lines or cable lines.

Information required by the user is transmitted by a merchant system which may comprise one or more servers to the remote communication device. Content information, such as merchant application pages may be transmitted from the merchant system to the remote communication device as well as call control functionality, such as the ability to perform conference calling or transfer the call to another party. This allows for a merchant to set up remote locations

with a minimal set up in terms of equipment and network access and allows the user of the remote location to have sophisticated communication functionalities.

Brief Description of the Drawings

FIG. 1 is a block diagram of a system for providing call center functionality at a remote site in accordance with an embodiment of the present invention.

FIG. 2 is a flow chart illustrating the log-in process according to an embodiment of the present invention.

FIGs. 3A and 3B are a flowchart illustrating the processing of an incoming telephone call according to the embodiment of the present invention.

FIG. 4 is a diagram illustrating a call control page according to an embodiment of the present invention.

FIG. 5 is a diagram illustrating a merchant application page according to an embodiment of the present invention.

FIGs. 6A and 6B are flow charts illustrating the ability for a CSR to push pages to a customer and a customer to push pages to a CSR according to the embodiment of the present invention.

Detailed Description

Referring to the figures in which like numerals indicate like elements, Fig. 1 is a block diagram of a system for providing call center functionality at a remote site according to an embodiment of the present invention. Customers desiring to contact a customer service representative (CSR) use a customer communication device (CCD) 102a –102c to contact the CSR. The customer communication devices 102a-102c can be any number of communication devices including, but not limited to, a telephone, personal computer, cellular telephone, a set-top box, a combination of such devices or other type of device which is capable of connecting to one or more communication networks. For illustrative purposes, the customer communication device 102a is a telephone, which may be a conventional telephone, ISDN telephone or a cellular phone, customer communication device 102b is a personal computer and customer

communication device 102c is either a personal computer, a combination of personal computer and telephone, or a set top box connected to a communication device, e.g., an infrared remote control and/or a keyboard and which may be associated with a television. It is to be understood that the number and type of customer communication devices depicted in Fig. 1 are merely exemplary and that any number of customer communication devices can be used to contact the CSRs. It is to be further understood that each customer that may try to contact a CSR can use any of the customer communication devices described above.

In order to contact the CSR, the customer inputs contact information into the customer communication device 102. This contact information may be a telephone number, for example a toll free number, an Internet Protocol (IP) address, or any other type of contact information which is required by a communications network 108 to reach the CSR. In the case of communication device 102a or if a telephone is included in customer communication device 102c, the customer would input the merchant's telephone number in the conventional manner (e.g., use dual tone multi-frequency (DTMF) signals). In the case of customer communication device 102b or the computer associated with customer communication device 102c, the customer could input the merchant's telephone number by inputting alphanumeric characters into a keyboard connected to the computer. Furthermore, the customer may have software resident on the customer communication device that is capable of handling Internet telephony calls (also referred to as Voice Over IP (VoIP)). In the case of customer communication device 102c, the customer may input the merchant's telephone number using a remote control to send infrared signals to a set top box associated with a television.

The term VoIP has come to reflect a variety of network elements, techniques and technologies, all contributing, in one way or another, to the transmission of a voice call in accordance with the Internet Protocol (IP) over at least a part of its path between one or more voice callers and one or more other voice call participants. Voice packets may be delivered to a VoIP "gateway"

where they are delivered through the Internet or other IP network for ultimate delivery to one or more call participants. VoIP gateways and associated network elements are available from many suppliers. For example, eFusion, Inc., Lucent Technologies, Inc and VocalTec Communications market such VoIP gateways and related products to enable interconnections between the Public Switched Telephone Network and data networks (including the Internet). The Internet Engineering Task Force (IETF), the iNOW industry consortium and other standards bodies are considering various proposals for enabling Internet telephony applications. Other aspects of VoIP are described, *e.g.*, in *Delivering Voice over IP Networks*, by D. Minoli and E. Minoli, John Wiley & Sons, 1998.

If an IP address is used to contact the CSR, a similar input procedure would be used to communicate the address. For example, in the case of customer communication device 102b or the computer or keyboard associated with customer communication device 102c, the customer may input a Uniform Resource Locator (URL) that corresponds to a web site operated or maintained by the merchant and which contains a link to the CSR. If the CCD has speech recognition capabilities and a microphone (not shown), the customer may speak the URL into the microphone. Once the customer contacts the web site, the customer may be able to click on an icon within the web site, which will then connect the customer to the CSR.

The contact information is communicated to a communication network 108 in a number of ways depending upon the type of customer communication device 102 used and the type of contact information received. In the case of customer communication device 102a, the contact information is received by a switch 104 which may be located in a Public Switched Telephone Network (PSTN) and may be what is known as a local switch (e.g., a 5ESS switch manufactured by Lucent Technologies, Inc.) or a toll switch (e.g., a 4ESS switch manufactured by Lucent Technologies, Inc.). In the case of a cellular telephone, the switch may be a mobile telephone switching office (MTSO). If the contact information is a telephone number, the switch 104 determines where the call should be routed. For example, the switch 104 may send the number to a database 105 contained

within the PSTN for further routing instructions. The database 105 will then route the call a voice-to-IP converter 113 which will then route the converted IP signals to the communications network 108 and ultimately to a CSR communication device 110 as will be described in more detail hereinafter.

Alternatively, in the case of customer communication device 102a and 102b, the contact information may be received by switch 104 and sent to an Online Service Provider (OSP) 106. The OSP 106 can be an Internet service provider such as AT&T Worldnet™. The OSP 106 provides access to the communications network 108 by providing software to the customer communication device 102a which allows the customer communication device 102a to access the communication network 108 via Points of Presence (POPs) (not shown) which are typically operated and maintained by the OSP 106.

When a customer wishes to access the communication network 108, the customer types in a command that causes the communication device 102b, via a modem (not shown), to dial into the POP. The POP requests a user identification code and password that is verified by the OSP 106. The POP then acts as a gateway to provide the customer access to the communication network 108. Once the customer communication device 102 is connected to OSP 106, the customer may enter the IP address, which corresponds, to the merchant's web site.

In the case of customer communication device 102b, if the customer has a direct connection to the Internet, the contact information is received by an IP router 103. The contact information may be a URL corresponding to the merchant's web site or a telephone number for the merchant if the customer communication device 102b includes software for placing and completing Internet telephony calls.

In the case where the customer communication device 102c is connected to a cable network, the contact information is received by a cable modem 107 which transmits the information to a cable headend 109. The cable modem 107 may be, for example a uBR904 cable modem manufactured by Cisco Systems, Inc. or a ComPORT 1000 manufactured by Com21, and the cable headend may

be, for example a uBR7246 Cable Modem Termination System (CMTS) manufactured by Cisco Systems, Inc. or a ComCONTROLLER 2100 manufactured by Com21. The contact information, which may be a telephone number or a URL address, is communicated using the methods described above and received by cable modem 107. The cable modem 107 is capable of receiving both voice and data signals.

The communication network 108 used to carry the calls placed by the customer to the CSR may be a cable network or a data network, such as an Asynchronous Transfer Mode (ATM) network or frame relay network or other type of broadband network such as, but not limited to a Digital Subscriber Line (DSL), ISDN or a combination of these networks. The communication network 108 may also be a packet network which may comprise a single packet network or a multiplicity of packet networks, such as, e.g., the "backbone" networks comprising the Internet or an Intranet. Data sent over a data or packet network can be encrypted, for example, using a 128 bit RSA algorithm.

Each customer service representative (CSR) is remotely located at a CSR site. Each CSR site includes a CSR communication device 110. For the sake of example, the CSR communication device 110 is referred to herein as the CSR computer 110. CSR computer 110 may be a standard personal computer which may include a processor, memory, a modem and a monitor or display. The CSR may also be a device such as WebTV which is manufactured by Microsoft Inc. or any other type of device which includes memory, a display and software which allows for Web browsing. CSR computer 110 can include a Web browser, such as Netscape Navigator available from Netscape Communications Corp., to download, for example, Web pages from other computers on the World Wide Web. The CSR communication device 110 can also include a telephone as is described in Serial No. 08/933,518, entitled Virtual Call Center, filed September 18, 1997 which is incorporated by reference.

While only one CSR site is shown in Fig. 1, it is to be understood that a plurality of CSR sites may be located in various locations. When a CSR is

working, the CSR will access a web server 116 associated with the merchant (also referred to as a merchant server) via the communication network 108.

As with the customer communication devices 102b and 102c, the CSR communication device 110 establishes a connection with the communication network 108 in a similar manner. The CSR communication device 110 may connect via an Online Service Provider 122 to the communication network 108 or if the CSR has a direct connection to the communication network 108 via a router 124. The OSP 122 can be an Internet service provider such as AT&T Worldnet™. An OSP provides access to the communication network by providing software to the CSR communication device 110 which allows the CSR communication device 110 to access the communication network 108 via Points of Presence (POPs) (not shown) which are typically operated and maintained by the OSP. When the CSR wishes to access the communication network 108, the CSR types in a command that causes the communication device 110, via a modem (not shown), to dial into the POP. The POP requests a user identification code and password that is verified by the OSP. Once connected the OSP will require a client certificate ID via a secure connection. The POP then acts as a gateway to provide the CSR access to the web server 116. In accordance with the preferred embodiment, both the customer call and the data from the web server will be communicated over the communication network to the CSR communication device 110.

The CSR communication device 110 can also connect to the communication network via a cable network. The CSR communication device can transmit connection information to a cable modem 130 which then transmits the information to a cable headend 132 which routes the information to the communication network 108 and ultimately to the web server 116 and call control server 112.

A voice response unit (VRU) 115 is connected to the web server 116 which automatically answers incoming customer calls received over the communication network 108 and prompts the customer with a series of menu options or questions. VRU 115 also temporarily stores customer responses

which may be provided as spoken answers and/or dialed or touch tone answers or other key inputs such as from a computer keyboard. VRU 115 includes, for example, dual tone multi-frequency (DTMF) tone generator and decoder, and speech recognition and speech synthesis equipment. It is to be understood by those skilled in the art that the functions of the VRU may be incorporated in another network element or in the web server 116 or call control server 112 without departing from the scope and spirit of the present invention. It is also to be understood by those skilled in the art that other means may be used to gather customer information such as, but not limited to, a toll free number, data may be retrieved from a customer database based upon the customer's ANI (automatic number identification), or by the use of a device such as PML.

A call control server 112 is connected to the communication network 108 via a merchant or web server 116. Calls received by the web server 116 are routed over the communication network 108 under control of call control server 112 to a selected CSR site 110 for processing. A CSR database 114 is connected to call control server 112. The CSR database 114 stores information for each CSR which pertains to log-in procedures. The log-in information includes the CSR's name, a computer log-in ID and password, and the IP address and port number (stored dynamically) and the certificate ID of the computer used by the CSR. Additional information may be stored in the CSR database 114. Alternatively, this information may be stored in call control server 112.

Call control server 112 also keeps track of which CSRs have logged into the system and which are currently available to receive incoming calls (e.g., those CSRs not on break and not processing another customer call). As a result, call control server 112 maintains a list of the currently available CSRs, and updates the list after, for example, assigning an incoming call to a CSR, or after receiving notice from a CSR that the CSR has logged-in, logged-out or is on break. Alternatively, the web server 116 can keep track of the CSRs and maintain a list of available CSRs. It is to be understood by those skilled in the art that the specific arrangement of servers and databases depicted in Fig. 1 is

merely exemplary and that functions of one or more servers and/or databases could be combined into a single server or a number of distributed servers without departing from the scope and spirit of the present invention.

The updated list of available CSRs can be constantly made available to a merchant Private Branch Exchange (PBX) or Automatic Call Distributor (ACD) 117 and web server 116. The merchant PBX/ACD 117 determines which CSR should receive a particular call. In addition, the merchant PBX/ACD 117 also routes calls from the CSR to a particular customer. It is to be understood by those skilled in the art that the merchant PBX/ACD 117 can also be located in the network as illustrated by network PBX/ACD 119. The functionality of both PBX/ACD is essentially identical. A network PBX/ACD may be shared among a number of merchants whose call centers are of a relatively small size. Typically a merchant with large call centers, such as for example L.L. Bean™, would have its own PBX/ACD.

As illustrated in Fig. 4 and described in further detail below, call control server 112 provides a call control page 400 to each of the CSR sites. Each of the call control pages include a set of clickable commands (e.g., transfer, hold, conference, speed-dial buttons, and the like) and the ability to answer and converse with a customer. The call control page provides each remotely located CSR with call control functions via the communication network 108. The call control page could be, for example, a Telnet page, a Web page, or the like that may be pushed or downloaded from call control server 112 via communication network 108 to the computer being used by the CSR. The call control server 112 can identify the computer being used by the CSR based on, for example, the IP address and port number of the CSR's computer stored in CSR database 114 or call control server 112.

A web server 116 is connected to communication network 108. A merchant database 118 is connected to web server 116 that stores customer information including each customer's name, address, telephone number and/or IP address depending upon which is applicable, account history or purchase history, credit card number(s), clothing sizes for different family members and

other customer information. Web server 116 provides merchant application pages (such as Telnet pages, Web pages or the like) to each CSR computer 110. The merchant application pages can include, for example, customer order entry forms which allow CSRs to receive and process customer orders received via telephone for products and/or services offered by the merchant. An example of a merchant application page 500 is illustrated in Fig. 5 which will be described in further detail hereinafter.

The CSR computer 110 receives call control pages, merchant application pages and other information as well as incoming telephone calls or IP requests. The CSR computer 110 can establish a data communications link (such as a Telnet connection or a TCP connection) with other computers via communication network 108. In this manner, CSR computer 110 can receive Web pages and/or Telnet pages or the like, and send and receive data via communication network 108. The CSR computer 110 also includes software for completing Internet telephony calls and as such can establish a voice communications link with the customer's communication device via the communication network 108 by initiating telephone calls to other communication devices, and by receiving telephone calls from other communication devices.

Although only one CSR site is illustrated in Fig. 1, the system of Fig. 1 would typically include many CSR sites at different remote locations. For example, each CSR's home or residence could operate as a remote CSR site if properly equipped with a CSR computer.

In operation, a CSR located at a CSR site is provided with full call center functionality at computer 110, including (1) the merchant application (e.g., a merchant's product order form to process customer orders), (2) full call control functions, such as the ability to place a call on hold, transfer a call, conference together two parties, speed dial functions, etc., and (3) ability to send and receive telephone calls.

The call control page includes a set of clickable commands and phone digits which allow the CSR to issue commands to call control server 112. Once the call control commands are received at call control server 112, call control

server 112 can then control commands (e.g., transfer the call, place the call on hold, conference in a specified party). The merchant application (e.g., merchant product order form) can be provided from web server 116 to CSR computer 110 as one or more pages (e.g., Telnet or Web pages, or the like).

The operation of the system of Fig. 1 according to an embodiment of the present invention can be described as three processes: 1) the log-in process for a CSR, 2) the processing of incoming and/or outgoing telephone calls, and 3) the ability to share information between the CSR and customer (e.g., co-browsing). These processes are described in detail hereinbelow with reference to Figs. 2, 3, 6A and 6B, respectively.

Fig. 2 is a flow chart illustrating the log-in process for a CSR according to an embodiment of the present invention. At step 210, a CSR database is created by storing computer log-in information that allows each CSR to log-in to a merchant system 125. The merchant system 125 includes the call control server 112, call control database 114, web server 116, merchant database 118 and merchant PBX/ACD 117. The log-in information includes the CSR's name, address, a log-in ID and password which is received by call control server 112. The IP address and port number of the CSR computer 110 are dynamically stored once the CSR has logged in and is used to forward incoming telephone calls to the CSR computer 110. The information created at step 210 may be stored, for example, in either database 114, call control server 112 or VRU 115 and is communicated to merchant PBX/ACD 117 or network PBX/ACD 119.

At step 215, the CSR logs in to call control server 112 via communication network 108. To log-in to call control server 112, first the CSR uses computer 110 to establish a communications link between computer 110 and call control server 112 via communications network 108. The communications link can be established using well known protocols such as TCP/IP, so that on-line information from call control server 112 is available in the form of Web pages or the like to computer 110. For example, a TCP connection may be established between computer 110 and call control server 112. The CSR then uses a Web browser to download the Web page provided by call control server 112 for the

purpose of CSR computer log-in. The CSR then inputs his or her log-in ID and password. The inputted computer log-in ID and password are then transmitted back to the call control server 112 via the communications link established between CSR computer 110 and call control server 112. In addition, the Certificate ID of CSR computer 110 or a Cookie may also be transmitted to call control server 112. Other information useful for authentication may also be transmitted to call control server 112.

Once call control server 112 receives the log-in ID, password, the Certificate ID and/or the Cookie from the CSR computer 110, call control server 112 then authenticates the CSR and/or the CSR computer 110, step 220. First, call control server 112 compares the computer log-in ID and password received from CSR computer 110 to the log-in ID and password stored in database 114. If a match is found, then the CSR is authentic. Next, call control server 112 can authenticate CSR computer 110 by comparing the Certificate ID and/or Cookie stored in the CSR database 114. If a match is found, the CSR computer 110 is authenticated.

If the CSR and/or the CSR computer 110 is found to be authentic, the computer log-in process (including authentication) is completed. The IP address and port number associated with CSR computer 110 is communicated over the communications link during the log-in process and is dynamically stored in database 114. As described hereinbelow, this address information can be used by call control server 112 and web server 116 to provide Web pages to CSR computer 110.

Once the computer log-in and authentication process is completed, the process of Fig. 2 then proceeds to step 225. However, if the CSR and/or the CSR computer 110 are not authentic, the process is terminated, and an error message may be returned to be displayed on CSR computer 110.

At step 225, call control server 112 notifies the web server 116 that the CSR device has logged in and been authenticated. The call control server 112 then notifies the web server 116 and VRU 115 to establish a voice communication between the web server 116 and the CSR device 110. At step

230, the web server 116 retrieves the IP address and port number for the CSR device from the database 114 and establishes a voice channel with the CSR device 110. Next a log-in and authentication process is performed in order to verify the identity of the CSR. This is to ensure that someone other than the CSR is not trying to log onto the CSR device (e.g., a family member or hacker). The web server 116 calls the CSR device 110 via the communications network 108 and the CSR answers the call. At step 235 the CSR log-in and authentication process is performed. VRU 115 prompts the CSR to provide a user ID and a user password over the established voice channel. Alternatively, VRU 115 may only prompt for a user password. For example, VRU 115 may prompt the CSR by stating: "Please speak or input your call center password now." the CSR then inputs the user password. VRU 115 receives and decodes the password using speech recognition equipment to analyze a spoken password. The received password is then compared to the CSR's password stored in database 114. If a match is found, the CSR is now authenticated and the process is complete.

At step 240, call control server 112 notifies the web server 116 and the merchant PBX/ACD 117 or network PBX/ACD 119 that the CSR computer 110 has logged in and has been authenticated. Also, call control server 112 informs the web server 116 and merchant PBX/ACD 117 or network PBX/ACD 119 that the CSR computer is ready to receive and process calls. At step 245, the call control server 112 logs-in the CSR to web server 116 and provides the web server 116 with the IP address and port number associated with the CSR computer 110. Call control server 112 then places the CSR on the list of available CSRs.

At step 250, call control server 112 pushes a call control page 400 (e.g., a Web page, a Telnet page) to CSR computer 110, and web server 116 pushes a merchant application page 500 (e.g., a Web page, a Telnet page) to CSR computer 110. The call control Web page 400 includes a clickable set of commands 402 and phone digits 404 which allows the CSR to issue commands using CSR computer 110 to call control server 112 regarding incoming calls. The

call control commands provided to the CSR can include an answer command 402a instructing call control server 112 to connect the received (or a specified) call to the CSR computer 110; a hangup or terminate command 402b instructing the call control server 112 to disconnect or terminate the received call; a transfer command 402c instructing the call control server 112 to transfer the received call to another party; a conference command 402d instructing the call control server 112 to conference in another party for the call; a hold command 402e instructing the call control server 112 that the received call should be placed on hold; one or more speed dial commands 408 instructing the call control server 112 to transfer the call to a party specified by the speed dial command, or to call the party specified by the speed dial command; and a mute command 402g.

The present invention also includes a break request/break return command 402f. This command, for example, can be toggled by the CSR between the "break request" and the "break return" commands. If the "break request" command has been selected, this instructs call control server 112 that the CSR is unavailable and/or on break. In such case, call control server 112 will remove the CSR from the list of available CSRs. As a result, the call control server 112 will not forward any incoming calls to a CSR that is on break or is unavailable. If the "break return" command has been selected, this instructs call control server 112 that the CSR has now returned from break and is now available to receive calls. Upon receiving the "break return" command, call control server 112 then adds the CSR to the list of available CSRs.

The call control page 400 also includes one or more displays for displaying information to the CSR. One such display 410 may include such information as the ANI associated with the customer or the DNIS in the case where the CSR has initiated the call to the customer, date and time, current command in use, menu associated with a particular command (e.g., list of speed dial numbers available) and any other information which may be of use to the CSR. Another display 414 may include queue information which indicates how many calls are waiting to be answered by the CSR, the amount of time each customer has been on hold and other information that may be pertinent. In the

case of a supervisor or monitor as will be discussed in further detail hereinafter, another display 416 may include a list of agents that are currently active, their current status (e.g., on a call with a customer, idle, on break, etc.) and other pertinent information. Also included on a call control page for a monitor would be a monitor talk command button 418 and a monitor listen button 420 for listening and/or talking on a call between a particular CSR and a customer. Also included on the call control page 400 is an illustration of a handset 412. The handset provides an indication of whether the call is on-hook or off-hook by illustrating an analogous situation in the case of a real telephone.

Call control server 112 and web server 116 are shown in Fig. 1 as separate servers. Alternatively, the functions of call control server 112 and web server 116 can be combined into a single server. This single server would provide both the call control page and the merchant application page to CSR computer 110. Likewise, either call control server 112 or web server 116, or both, may be distributed across a plurality of servers if the merchant is particularly sizable or alternatively, may require multiple servers with redundant information.0

Fig. 3 is a flow chart illustrating the processing of an incoming call according to the embodiment of the present invention. The process illustrated in Fig. 3 assumes that one or more CSRs have previously completed the log-in procedure and are prepared to receive and process incoming calls. Once the CSR has successfully logged in, the CSR can also place outgoing calls as will be described hereafter.

At step 305, a voice communications link is established between the customer's communication device and the communication network 108. This voice communications link can be established in a number of ways. First, a customer can call the merchant using customer communication device 102 by dialing, for example, the merchant's toll free telephone number. The call would be received by switch 104 which would perform a database 105 look up which would indicate that the merchant's toll free number is an Internet telephony

number. The call would be communicated over the communication network 108 and ultimately to the CSR computer 110.

Alternatively, if the customer communication device is capable of making Internet telephony calls, the entire call may be carried over the Internet. Furthermore the customer may connect to the merchant's web site by inputting the merchant's URL, and once the merchant's web site is accessed, click on an icon to be connected to the CSR computer 110. The icon can result in one of the following: a call being placed from the customer communication device 102 to the CSR computer 110 or a call being placed from the CSR computer 110 to the customer communication device 102. In such a case, the customer's telephone number would be provided to the CSR for call back purposes.

At step 310, VRU 115 answers the call from the customer and prompts the customer for various information. The prompting function of the VRU 115 can be accomplished by using a series of menus. For example, the customer may be requested to input his telephone number, address, credit card number, account number or information identifying a product which he or she is interested in, etc. The customer may be requested to identify (e.g., select from a list) the reason for calling (e.g., to obtain customer service, to place an order, to request product repairs, to obtain an account balance or account information). This information can be provided by the customer by either keying in the requested information (e.g., by keyboard or keypad) or by voice if the VRU has speech recognition capabilities. The information is then stored in memory, which may be resident in either VRU 115, communication network 108, call control server 112, database 114, web server 116 or database 118. Information identifying the customer's communication device (e.g., telephone number or IP address) may also be stored in memory.

At step 315, communication network 108 notifies call control server 112 and web server 116 of the received call. At step 320, an available CSR is selected by either the merchant PBX/ACD 117 or the network PBX/ACD 119 to receive and process the received call. The merchant PBX/ACD 117 or network PBX/ACD 119 would typically select an available CSR to receive the call based

in part on information received from the call control server 112. The call control server 112 keeps track of the status (logged in, on break, returned from break, busy, etc.) of each CSR and maintains a list of available CSRs. The merchant PBX/ACD 117 or network PBX/ACD 119 received information from the communication network 108 as well which pertains to whether a CSR is already connected to a customer and in the case of a large volume of calls, the size of a queue associated with each CSR. Alternatively, at step 320, VRU 115, communication network 108 or web server 116 may obtain the list of available CSRs from call control server 112 and select on of the CSRs to receive the call. Call control server 112 would then be notified of the selected CSR so the selected CSR can 1) receive the call and 2) be removed from the list of available CSRs.

At step 325, call control server 112 notifies web server 116 and the communication network 108 of the selected CSR for the call. The web server 116 can also be provided with the IP address and port number for the computer 110 of the selected CSR. At step 330, the customer information (e.g., customer account number, customer's name, address, telephone number, reason for calling) and the customer communication device identification information (e.g., IP address, ANI and/or DNIS) that were received and stored at step 310 are then sent to web server 116 for storage. Alternatively, this information may be directly stored on web server 116 at step 310.

At step 335, the call control page for controlling the received call is pushed from the call control server 112 to the CSR computer 110. As described above, the call control page for this call can include a series of clickable commands and telephone digits that allow the CSR to control the received call. The call control web page 400 is received at CSR computer 110 and displayed on computer 110 to be viewed by the CSR. This call control page 400 can be used for all calls to be routed to the CSR for processing. Alternatively, a call control page 400 may be provided after the CSR logs in to the call control server 112 (e.g., step 235, Fig. 2). This call control page 400 would be used for all calls routed to the CSR.

At step 340, the web server 116 selects a merchant application page, inserts customer information into the application page, and pushes the partially completed page to the CSR computer 110. As a result, step 340 may involve several sub-steps. The customer device identification information (e.g., ANI signal information, IP address, etc.) stored in web server 116 may be used by web server 116 to identify from the merchant database 118 a customer file or customer record corresponding to the customer's device information.

Also, there may be many merchant application pages available from web server 116. For example, web server 116 may provide different web pages for different types of customer requests, such as requests for customer service, requests to place an order, a request for repairs, etc. Web server 116 may select one of the several available merchant application pages based on the information input by the customer to the VRU 115. For example, if the customer indicates that he or she wishes to order merchandise, a merchant application page required for order taking will be sent to the CSR answering that particular customer's request.

As part of step 340, in one embodiment of the present invention, the web server 116 inserts at least a portion of the following into one or more selected merchant application web pages: 1) customer information input by the customer to VRU 115, and 2) the customer records or files identified by customer identification information or identified by information input by the customer (e.g., account number, telephone number, IP address). Based on the IP address and port number of CSR computer 110, the web server pushes these partially completed merchant application pages to CSR computer 110 via communications network 108 to be viewed by the CSR.

An example of a merchant application page 500 is illustrated in Fig. 5. The merchant application page 500 is illustrative of the type of page which may be used by a CSR to take an order. The customer information 502 received by the VRU115 is included in the merchant application page for the CSR's ease of use. The customer information 502 may include, but is not limited to, the customer's name 502a, address 502b, telephone number 502c, account number

502d, IP address 502e and credit card number 502f. As is illustrated in Fig. 5 this information is included in the merchant application page 500 by the web server 116 prior to the page being pushed to the CSR computer. The merchant application page 500 also includes spaces 504 to be completed by the CSR, which correspond to the information required to take the customer's order. The information required may include, but is not limited to, the product number 506, product description 508, cost of product 510, size 512, color 514 and the total cost for the products purchased 516. It is to be understood that the particular format and information contained in merchant application page 500 is merely exemplary and that other formats and/or information can be combined in a merchant application page without departing from the scope and spirit of the present invention.

At step 345, call control server 112 transfers the received call to the CSR computer 110. At step 350, the CSR processes the call by speaking to the customer via a voice path established between the CSR computer 110 and the customer communication device 102. The CSR uses a data path established between the CSR computer 110 and the customer communication device 102 to push pages of information to the customer as described in more detail below and also to complete the merchant application pages. It is to be understood by those skilled in the are and the description contained herein that the voice path and the data paths may be separate paths or may be combined in a single path. The completed merchant application page is transmitted from CSR computer 110 to web server 116.

At step 355, the CSR actuates one or more of the clickable call commands and telephone number digits on the call control page to control the call (e.g., hold, transfer, conference, and other commands). At step 360, a signal corresponding to the command actuated by the CSR on the call control page (at step 355) is transmitted (e.g., as one or more packets) from the CSR computer 110 to call control server 112 via communications network 108. The signal corresponding to the actuated call control command is then communicated to

communication network 108 to allow the network to perform the requested action on the call.

As indicated above not only may the CSR computer 110 receive merchant application pages but the CSR computer 110 may also push pages to the customer. If the customer communication device 102 has a data connection as in the case of customer communication devices 102b and 102c, the CSR can direct pages of interest to the customer. Likewise, the customer may push pages to the CSR.

Figs. 6A and 6B is a flow chart illustrating the pushing of pages between the CSR and customer according to the embodiment of the present invention. Sometimes during a call between a CSR and a customer, a CSR or customer may find it helpful to be able to provide additional information to the other party in the form of a web page. For example, if a CSR is taking an order from a customer for certain items, the CSR may be aware of similar or complementary items that the customer may be interested in or such items which are on sale. Instead of relying on a verbal description of those items, the CSR can direct the customer to the web page which illustrates the items and which may provide some description of the item.

In such a case the CSR would open a page corresponding to the URL for a particular item on the CSR computer 110 (step 602). The CSR can then instruct the computer 110 to send or push the page associated with the URL to the customer's CCD 102 (step 604). Such instruction may be implemented by an icon presented on the call control page 400 or other page that the CSR is viewing. Once the instruction is sent, it is received by the web server 116 which retrieves the origination address for the customer (step 606). It is to be understood that such function may be performed by the call control server 112 or other network element. The customer's origination information may include, for example the IP address and port associated with that particular customer. Such information may be retrieved using conventional methods. The web server then communicates the URL to the customer's origination address via the communications network 108. The URL is received by the CCD 102 which loads

the corresponding web page (step 608). The customer is then able to view the pushed web page (step 610).

Other situations may present themselves in which a customer wishes to provide additional information to the CSR. For example, the customer may be interested in knowing if a merchant carries a particular product. Again, rather than providing a verbal description of the product, the customer can direct the CSR to the web page which illustrates the items and which may provide some description of the item.

In such a case the customer would open a page corresponding to the URL for a particular item on the CCD 102 (step 620). The customer can then instruct the CCD 102 to send or push the page associated with the URL to the CSR computer 110 (step 622). Such instruction may be implemented by an icon presented on the customer's screen. Once the instruction is sent, it is received by the web server 116 which retrieves the origination address for the CSR with whom the customer is interacting (step 624). It is to be understood that such function may be performed by the call control server 112 or other network element. The CSR's origination information may include, for example the IP address and port associated with that particular CSR. Such information may be retrieved using conventional methods. The web server then communicates the URL to the CSR's origination address via the communications network 108. The URL is received by the CSR computer 110 which loads the corresponding web page (step 626). The CSR is then able to view the pushed web page (step 628).

As indicated above, in addition to pushing pages to a customer, the CSR can also initiate calls to a customer. Such call initiation would be done in the usual fashion. A voice communications link is established between the CSR computer 110 and the communication network 108. This voice communications link can be established in a number of ways. First, a CSR can call a customer using CSR computer 110 by inputting, for example, the customer's telephone number. The call would be routed through the communications network 108 to switch 104 which would route the call to the CCD 102.

In the case where the CSR computer 110 is connected to a cable network, the customer information is received by a cable modem 130 which transmits the information to a cable headend 132. The customer information which may be a telephone number or a URL address is communicated using the methods similar to the customer's initiation of a call as described above. The cable modem 130 is capable of receiving both voice and data signals.

The system of Fig. 1 can also include one or more remotely located monitor sites. Like the CSR site, each monitor site includes a monitor communication device for initiating calls and for sending and receiving Web pages and other data. A supervisor remotely located at his or her monitor site (e.g., at home or another office location) can log-in to call control server 112 in the same manner as the CSRs. Once properly logged-in and authenticated, the supervisor's computer at the monitor site receives a monitor web page from call control server 112 that provides a list of all active calls in the system. The supervisor can listen or monitor any active call by clicking on the call listed on the monitor web page. Also, using the commands on the monitor web page, the supervisor can elect one-way communication (e.g., the supervisor can only listen), or can elect two-way communications, allowing the supervisor to listen and speak with the parties on the selected call. Clicking on a call on the monitor web page sends a signal to the call control server 112 that instructs the call control server 112 and communication network 108 to connect the supervisor's computer to the selected call. This allows the supervisor to remotely monitor the active calls.

While the present invention has been described in connection with the illustrated embodiments, it will be appreciated and understood that modifications may be made without departing from the true spirit and scope of the invention. For example, while the present invention is described with reference to call center services, the described system could be used for other service applications such as telecommuting or other applications in which remote access is required. It is to be understood that the particular embodiments shown and described by way of illustration are in no way intended to be considered limiting.

Therefore, references to details of particular embodiments are not intended to limit the scope of the claims, which in themselves recite only those features regarded as essential to the invention.